

REMARKS

The Office Action dated December 8, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 3, 5, 7, 9, 11, 15-17, 22-23, and 26 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Therefore, claims 1, 3-5, 7, 9-11, 15-17, 19, 22-23, and 26 are currently pending in the application and are respectfully submitted for consideration.

Claim Rejections Under 35 U.S.C. § 112

The Office Action rejected claims 1, 3-5, 7, 9-11, 15-17, 19, 22-23, and 26 under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description requirement (i.e. allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skill in the relevant art that the inventors, at the time the application was filed, had possession of the invention). Specifically, the Office Action alleged that the amended limitation of “*determining (or to determine) a new index value ... such that no audible error is introduced to a new second parameter value corresponding to the new index value*” introduces new subject matter, because the limitation is not specifically disclosed in the original specification. This rejection is respectfully traversed for at least the following reasons.

Applicants respectfully submit that the specification does provide support for the limitation, and that the claims have been further amended to clarify the subject matter. Specifically, the claims have been amended to recite “*determining (or to determine) a new index value ... such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.*” Applicants further submit that paragraph 0093 of the specification discloses that in an exemplary embodiment the Eq. (2.13) is able to change the fixed codebook gain factor without introducing audible error to the adaptive codebook gain. (See Specification at paragraph 0093, emphasis added). Applicants further submit that paragraph 0095 of the specification discloses that the new adaptive codebook gain in case of modes other than 12.2 kbits/s and 7.95 kbits/s correspond to the determined new gain index. (See Specification at paragraph 0095, emphasis added). Thus, Applicants respectfully submit that the highlighted sentences, when considered together, provide sufficient support for the limitation “*determining (or to determine) a new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.*” Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

The Office Action rejected claims 1, 3, 5, 7, 9, 11, 17, and 23 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Cezanne et al. (U.S. Publication No.

2004/243404) (“Cezanne”), in view of Eriksson et al. (U.S. Publication No. 2002/0184010) (“Eriksson”). The Office Action further alleged that prior art 3GPP TS 26.090 (cited by Applicant) is also disclosed by both Cezanne and Eriksson, and serves as a part of prior art teachings for showing allegedly inherent characteristics of Cezanne and Eriksson.

The Office Action took the position that Cezanne discloses all the elements of the claims with the exception of “determining a current second parameter value from the index further corresponding to a second parameter” and “by minimizing an error between the enhanced first parameter value and a new first parameter value corresponding to the new index value such that no audible error is introduced to a new second parameter value corresponding to the new index value.” The Office Action then cited Eriksson as allegedly curing the deficiencies of Cezanne. The Office Action further took the position that both Cezanne and Eriksson disclose the TS 26.090 standard, and that one of ordinary skill in the art would have recognized that the ARM method described in 3GPP TS 26.090 inherently uses a jointly quantized vector associating with the correction factor and adaptive codebook gain for lower bit-rate coding and the gain codebook search be performed by minimizing an error. (See Office Action at pages 6-7).

Applicants respectfully submit that said claims recite allowable subject matter for at least the following reasons.

Claim 1, upon which claims 3-5 are dependent, recites a method, which includes determining, at an apparatus, an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an

index corresponding to a fixed codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal and an adaptive codebook gain. The method further includes adjusting the old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The method further includes determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to the adaptive codebook gain; and determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.

Claim 7, upon which claims 9-11 are dependent, recites an apparatus, which includes a parameter value determiner configured to determine an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain and determine an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal and the adaptive codebook gain. The apparatus further includes an adjuster configured to adjust the old fixed codebook gain

correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The apparatus further includes an index value determiner configured to determine a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.

Claim 17, upon which claim 19 is dependent, recites a computer program embodied on a computer-readable medium comprising a program code configured to control a processor to execute a process of enhancing a coded audio signal comprising indices which represent audio signal parameters which comprise at least a fixed codebook gain representing a first characteristic of the audio signal and an adaptive codebook gain. The process includes determining an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain and adjusting the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The process further includes determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, and determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook

gain values, by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.

Claim 23 recites an apparatus, which includes parameter value determination means for determining an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain and determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal and the adaptive codebook gain. The apparatus further includes adjusting means for adjusting the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The apparatus further includes index value determination means for determining a new index value from a table relating index values to fixed codebook gain correction values and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value.

As will be discussed below, Cezanne and Eriksson fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features discussed above.

Cezanne describes voice quality enhancement that is performed directly on a bit stream of encoded speech. As described in paragraph [0039], of Cezanne, a fixed codebook excitation gain is extracted from a far-end bit stream and the fixed codebook excitation gain is increased (e.g., amplified) by the amount of a noise compensation gain to provide a modified fixed codebook excitation gain to compensate for the near-end noise. Finally, the original fixed codebook excitation gain is replaced with the modified fixed codebook excitation gain. According to paragraph [0040], of Cezanne, it is sufficient to extract only the fixed codebook gain table indices and operate on the fixed codebook gain indices. (See Cezanne at Abstract and paragraphs [0039]-[0040]).

Eriksson describes a network noise suppressor which includes means for partially decoding a CELP coded bitstream. The means determine a noise suppressing filter $H(z)$ from the decoded parameters. The means use this filter to determine modified LP and gain parameters. The means overwrite corresponding parameters in the coded bit-stream with the modified parameters. (See Eriksson at Abstract).

Applicants respectfully submit that Cezanne and Eriksson, whether considered individually or in combination, fail to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Cezanne and Eriksson fails to disclose, teach, or suggest, at least, *“determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to*

adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value,” as recited in independent claim 1, and similarly recited in independent claims 7, 17, and 23.

Regarding the cited prior art, Cezanne discloses that a noise estimator is applied to compute a noise level estimate from a near-end signal, and that a noise compensation gain is computed based on the noise level estimate. Cezanne further discloses that a fixed codebook excitation gain is extracted from the far-end bit stream, and the fixed codebook excitation gain is increased by the amount of the noise compensation gain to provide the modified fixed codebook excitation gain to compensate for the near-end noise. (See Cezanne at paragraphs [0039]-[0040]). Furthermore, Eriksson discloses that the fixed and adaptive codebook gains are coded independently. Eriksson further discloses that in some coding modes with lower-bit rate they are vector quantized, and the adaptive codebook gain is also modified by the noise suppression. (See Eriksson at paragraph [0057]).

Cezanne merely discusses setting the noise compensation gain proportional to the noise level, increasing the fixed codebook excitation gain by the amount of the noise compensation, and replacing the original codebook excitation gain with the modified fixed codebook excitation gain. Likewise, Eriksson merely discusses a noise suppression

algorithm which modifies the gain of an excitation signal. Neither Cezanne, nor Eriksson, disclose determining a new index value to achieve an enhanced first characteristic represented by a fixed codebook gain, by minimizing an error between a desired fixed codebook gain and a new fixed codebook gain correction factor such that no audible error is introduced to a new adaptive codebook gain value which, like the new fixed codebook gain correction factor, is represented by the new index value. Thus, Cezanne and Eriksson, whether considered individually or in combination, fails to disclose, or suggest, all the elements of independent claim 1.

Furthermore, while each of the claims have their own scope, Applicants respectfully submit that the arguments described above also apply to independent claims 7, 17, and 23.

Therefore, for at least the reasons discussed above, the combination of Cezanne and Eriksson fails to disclose, teach, or suggest, all of the elements of independent claims 1, 7, 17, and 23. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Claims 3 and 5 depend upon independent claim 1. Claims 9 and 11 depend upon independent claim 7. Thus, Applicants respectfully submit that claims 3, 5, 9, and 11 should be allowed for at least their dependence upon independent claims 1 and 7, and for the specific elements recited therein.

The Office Action rejected claims 4, 8, 10, 15-16, 22, and 26 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Cezanne, in view of Eriksson, and further in

view of alleged admitted prior art (paragraphs 0059-0064 of the specification) (“AAPA”). The Office Action took the position that Cezanne and Eriksson discloses all the elements of the claims with the exception of the background noise parameter value being an index value. The Office Action then cited AAPA as allegedly curing the deficiencies of Cezanne and Eriksson. Applicants respectfully submit that said claims recite allowable subject matter for at least the following reasons.

Claim 15 recites a method, which includes determining, at an apparatus, an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal, an adaptive codebook gain and a background noise parameter. The method further includes adjusting the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$, and determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to the adaptive codebook gain. The method further includes determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the

new index value. The method further includes detecting a current background noise parameter index value, and determining a new background noise parameter index value corresponding to the enhanced first characteristic.

Claim 16 recites an apparatus, which includes parameter value determination means for determining an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain and for determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal, the adaptive codebook gain and a background noise parameter. The apparatus further includes adjusting means for adjusting the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The apparatus further includes index value determination means for determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value. The apparatus further includes detecting means for detecting a current background noise parameter index value, and determining means for determining a new

background noise parameter index value corresponding to the enhanced first characteristic.

Claim 22 recites a computer program embodied on a computer-readable medium comprising a program code configured to control a processor to execute a process of enhancing a coded audio signal comprising indices which represent audio signal parameters which comprise at least a fixed codebook gain representing a first characteristic of the audio signal, an adaptive codebook gain and a background noise parameter. The process includes determining an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain, and adjusting the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The process further includes determining an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, and determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value. The process further includes detecting a current background noise parameter index value, and determining a new background noise parameter index value corresponding to the enhanced first characteristic.

Claim 26 recites an apparatus, which includes a parameter value determiner configured to determine an old fixed codebook gain correction factor $\hat{\gamma}_{gc}^{old}$ from an index corresponding to a fixed codebook gain and determine an old adaptive codebook gain value g_{p_old} from the index further corresponding to an adaptive codebook gain, wherein a coded audio signal comprises indices that represent audio signal parameters comprising at least the fixed codebook gain representing a first characteristic of the audio signal, the adaptive codebook gain and a background noise parameter. The apparatus further includes an adjuster configured to adjust the old fixed codebook gain correction factor in order to achieve an enhanced first characteristic, thereby obtaining a desired gain $\beta \cdot \hat{\gamma}_{gc}^{old}$. The apparatus further includes an index value determiner configured to determine a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value. The apparatus further includes a detector configured to detect a current background noise parameter index value, and a determiner configured to determine a new background noise parameter index value corresponding to the enhanced first characteristic.

As will be discussed below, the combination of Cezanne, Eriksson, and AAPA fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features discussed above.

Cezanne and Eriksson are described above. AAPA discusses discontinuous transmission. Specifically, during discontinuous transmission, only the average background noise information is transmitted at regular intervals to the decoder when speech is not present. (See AAPA).

Applicants respectfully submit that Cezanne, Eriksson, and AAPA, whether considered individually or in combination, fails to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Cezanne, Eriksson, and AAPA fails to disclose, teach, or suggest, at least, *“determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value,”* as recited in independent claim 15, and similarly recited in independent claims 16, 22, and 26.

While each of the claims have their own scope, Applicants respectfully submit the arguments regarding Cezanne and Eriksson, described above, with respect to independent claim 1, equally apply to independent claims 16, 22, and 26.

Furthermore, AAPA does not cure the deficiencies of Cezanne and Eriksson. AAPA merely discusses computing frame energy for each frame marked with (Voice Activity Detection) VAD = 0. AAP fails to disclose, or suggest, determining a new index value to achieve an enhanced first characteristic represented by a fixed codebook gain, by minimizing an error between a desired fixed codebook gain and a new fixed codebook gain correction factor such that no audible error is introduced to a new adaptive codebook gain value which, like the new fixed codebook gain correction factor, is represented by the new index value.

Therefore, for at least the reasons discussed above, the combination of Cezanne, Eriksson, and AAPA fails to disclose, teach, or suggest, all of the elements of independent claims 15-16, 22, and 26. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Furthermore, claims 4 and 8 depend upon independent claims 1 and 7, respectively. As discussed above, Cezanne and Eriksson does not disclose, teach, or suggest all of the elements of independent claims 1 and 7. Furthermore, AAPA does not cure the deficiencies in Cezanne and Eriksson, as AAPA also does not disclose, teach, or suggest, at least, *“determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value*

such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value,” as recited in independent claim 1, and similarly recited in independent claim 7. Thus, the combination of Cezanne, Eriksson, and AAPA does not disclose, teach, or suggest all of the elements of claims 1 and 7. Additionally, claims 4 and 8 should be allowed for at least their dependence upon independent claims 1 and 7, and for the specific elements recited therein.

The Office Action rejected claim 19 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Cezanne and Eriksson, in view of Etter et al. (U.S. Publication No. 2005/0071154) (“Etter”). (The Office Action actually reads “over CEZANNE and CEZANNE,” but it is assumed that CEZANNE AND ERIKSSON was intended). The Office Action took the position that Cezanne and Eriksson discloses all the elements of the claims with the exception of “computer program (software) is directly loadable into an internal memory of the computer.” The Office Action then cited Etter as allegedly curing the deficiencies of Cezanne. Applicants respectfully submit that said claims recite allowable subject matter for at least the following reasons.

Cezanne and Eriksson are described above. Etter generally discloses that an encoded speech signal is partially decoded to obtain an excitation parameter. The excitation parameter is used as input to estimate the noise level of the speech signal. The excitation parameter is the fixed codebook gain of the speech signal. The fixed codebook gain is multiplied by a scaling factor and then used as input for noise estimation. (See Etter at Abstract).

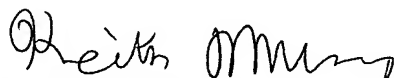
Claim 19 depend upon independent claim 17. As discussed above, the combination of Cezanne and Eriksson does not disclose, teach, or suggest all of the elements of independent claim 17. Furthermore, Etter does not cure the deficiencies in Cezanne and Eriksson, as Etter also does not disclose, teach, or suggest, at least, *“determining a new index value from a table relating index values to fixed codebook gain correction factors and relating the index values to adaptive codebook gain values, by minimizing an error $|\beta \cdot \hat{\gamma}_{gc}^{old} - \hat{\gamma}_{gc}^{new}|$ between the desired gain and a new fixed codebook gain correction factor $\hat{\gamma}_{gc}^{new}$ corresponding to the new index value such that no audible error is introduced to a new adaptive codebook gain value g_{p_new} corresponding to the new index value,”* as recited in independent claim 17. Instead, Etter merely discusses multiplying a fixed codebook gain parameter by a scaling factor and then using the scaled fixed codebook gain parameter as input to a noise estimator. Thus, the combination of Cezanne, Eriksson, and Etter does not disclose, teach, or suggest all of the elements of claim 19. Additionally, claim 19 should be allowed for at least its dependence upon independent claim 17, and for the specific elements recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1, 3-5, 7, 9-11, 15-17, 19, 22-23, and 26 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
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